(19) **JAPANESE PATENT OFFICE (JP)**

(11) **Japanese Laid-Open Patent Application (Kokai) No. H5-192449**

(12) **Official Gazette for Laid-Open Patent Applications (A)**

(43) Disclosure Date: August 3, 1993

(51)Int. Cl.[5]	Class. Symbols	JPO File Nos.	FI	Tech. Indic.
A 63 F	9/22	T 9209-2C		
		F 9209-2C		
		H 9209-2C		

Request for Examination: Not yet submitted

Number of Inventions: 4 (Total of 6 pages [in original])

(21) Application No.: H4-7371

(22) Filing Date: January 20, 1992

(71) Applicant: 000132840
Taito Corporation
Taito Building, 2-5-3 Hirakawa-cho, Chiyoda-ku, Tokyo

(72) Inventor: Yozo Koma
c/o Taito Corporation
Taito Building, 2-5-3 Hirakawa-cho, Chiyoda-ku, Tokyo

(72) Inventor: Toshiaki Matsumoto
c/o Taito Corporation
Taito Building, 2-5-3 Hirakawa-cho, Chiyoda-ku, Tokyo

(72) Inventor: Shinji Masayano
c/o Taito Corporation
Taito Building, 2-5-3 Hirakawa-cho, Chiyoda-ku, Tokyo

(72) Inventor: Tatsuo Nakamura
c/o Taito Corporation
Taito Building, 2-5-3 Hirakawa-cho, Chiyoda-ku, Tokyo

(74) Agent: Shoutaro Mogami, Patent Attorney

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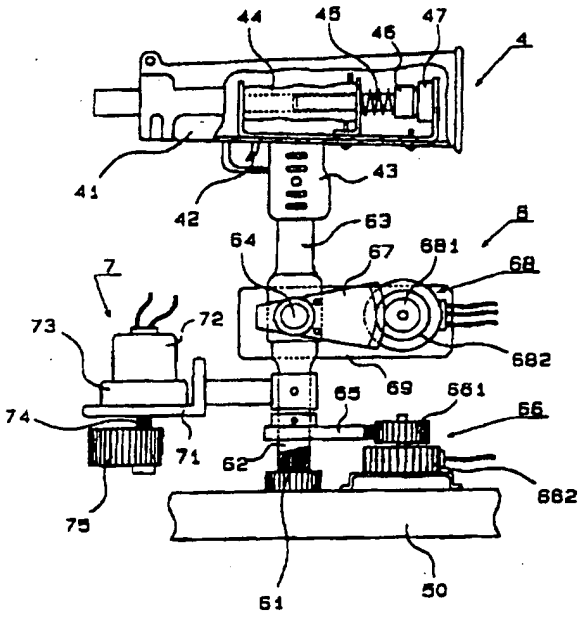
(74) Agent: Shoutaro Mogami, Patent Attorney

(54) [Title of the Invention] Video Gun Shooting Game Machine, and Method for Controlling this Machine

(57) [Abstract]

[Object] It is an object of the present invention to inexpensively provide a novel video gun shooting game machine which has a simple structure and with which hits on a friend can be sensed directly through the body, and to provide a method for controlling this game machine.

[Constitution] A vibration generator is provided to a simulated gun or its support device, a vibration generating command signal is generated along with a player-hit signal by a game control circuit when it is determined that the player has been hit, and as a result the vibration generator is operated for a specific length of time so as to impart vibration to the simulated gun.



[Claims]

[Claim 1] A method for controlling a video gun shooting game machine, in which the player engages in a mock gun battle with an enemy appearing on the screen of a video display device (2), which displays the developing situation of the game according to a predetermined game program, by using a simulated gun (4) whose barrel (41) direction can be controlled and which is equipped with an apparatus capable of generating a hit location signal corresponding to the direction of the barrel (41) when the player aims at the screen of the video display device (2) and pulls a trigger (42), an enemy-hit signal is generated and sent to a game control circuit (3) when the enemy is present at a hit location on the screen corresponding to the signal generated by the hit location signal generator, or a player-hit signal is generated when the player is hit by a bullet fired by the enemy, the progress of the game is varied by these signals, and points are tallied according to the injury sustained by the player and enemy as a result of these hits,

wherein said method for controlling a video gun shooting game machine is characterized in that a vibration generator (7) is provided to a simulated gun (4) or its support device (6), a vibration generating command signal is generated along with a player-hit signal by a game control circuit (3) when it is determined that the player has been hit, and as a result the vibration generator (7) is operated for a specific length of time so as to impart vibration to the simulated gun (4).

[Claim 2] The method for controlling a video gun shooting game machine according to Claim 1, wherein the duration of the vibration imparted to the simulated gun (4) is controlled according to the injury sustained when the player is hit.

[Claim 3] A video gun shooting game machine, comprising:

a game control circuit (3) loaded with a predetermined game program;

a video display device (2) that is controlled by the game control circuit (3) and displays the developing situation of the game; and

a simulated gun (4) whose barrel (4) can be aimed at the screen of the video display device (2), and which is equipped with an apparatus capable of generating a hit location signal corresponding to the direction of the barrel when the player pulls a trigger (42),

in which the player engages in a mock gun battle with an enemy appearing on the screen of the video display device (2), an enemy-hit signal is generated and sent to the game control circuit (3) when the enemy is present at a hit location on the screen corresponding to the signal generated by the hit location signal generator, or a player-hit signal is generated when the player is hit by a bullet fired by the enemy, the progress of the game is varied by these signals, and points are tallied according to the injury sustained by the player and enemy as a result of these hits,

wherein said video gun shooting game machine is characterized in that a vibration generator (7) is provided to the simulated gun (4) or its support device (6), and a circuit is provided for operating the vibration generator (7) for a specific length of time when a player-hit signal is generated.

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[Claim 4] The video gun shooting game machine according to Claim 3, wherein the vibration generator (7) comprises a motor (72) supported by a bracket (71) attached to a vertically rotating support shaft (62) that supports the simulated gun (4), and an eccentric weight (75) attached to an output shaft (74) of the motor (72) via a reduction gear (73).

[Detailed Description of the Invention]

[0001]

[Field of Industrial Utilization]

The present invention relates to a video gun shooting game machine and to a method for controlling this game machine.

[0002]

[Prior Art]

Video gun shooting game machines comprising a game control circuit loaded with a predetermined game program, a video display device that is controlled by the game control circuit and displays the developing situation of the game, and a simulated gun whose barrel can be aimed at the screen of the video display device and which is equipped with an apparatus capable of generating a hit location signal corresponding to the direction of the barrel when the player pulls a trigger, in which the player engages in a mock gun battle with an enemy appearing on the screen of the video display device, an enemy-hit signal is generated and sent to the game control circuit when the enemy is present at a hit location on the screen corresponding to the signal generated by the hit location signal generator, or a player-hit signal is generated when the player is hit by a bullet fired by the enemy, the progress of the game is varied by these signals, and points are tallied according to the injury sustained by the player and enemy as a result of these hits, are commonly known and have become very popular.

[0003] Various devices have been employed to make these games as realistic as possible by providing an apparatus for generating the feel of an impact or the sound of a bullet being fired when the trigger is pulled. Unfortunately, with conventional game machines of this type, when the player is shot, the image of an explosion or the like merely appears on the screen of the video display device, or a sound effect is generated, so the player cannot directly feel the hit, and consequently the game lacks realism or does not provide the feel of a simulated experience.

[0004] Realism and the feel of a simulated experience have recently become very important in video games, which is why game machines have become much bulkier, but a machine which allows the player to physically feel a hit on a friendly position by means of a simulator, for example, is extremely large and expensive, and is therefore not well suited to application to relatively inexpensive video gun shooting game machines. Accordingly, there have as yet been no proposals for video game machines that give the player a physical sensation of being shot.

[0005]

[Problems Which the Invention is Intended to Solve]

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It is an object of the present invention to inexpensively provide a video gun shooting game machine with which hits on a friendly position can be sensed directly through the body, and to provide a method for controlling this game machine.

[0006]

[Means Used to Solve the Above-Mentioned Problems]

The stated object is achieved by providing a vibration generator to a simulated gun or its support device in the above-mentioned conventional video gun shooting game machine, and providing a circuit for operating this vibration generator for a specific length of time when a player-hit signal is generated.

[0007] The stated object is also achieved by providing a vibration generator to the support device of a simulated gun in a method for controlling the above-mentioned conventional video gun shooting game machine, generating a vibration generating command signal along with a player-hit signal from a game control circuit when it is determined that the player has been hit, which results in the vibration generator being operated for a specific length of time and vibration being imparted to the simulated gun.

[0008]

[Examples]

An example of the present invention will now be described through reference to the appended drawings. Fig. 1 is a diagram illustrating the overall structure of the video gun shooting game machine pertaining to the present invention, Fig. 2 is a diagram illustrating an example of the structure of the simulated gun used in this video gun shooting game machine, and Fig. 3 is a flow chart of the game.

[0009] In Fig. 1, 1 is the overall game machine, 10 is the cabinet thereof, 2 is a video display device attached to the cabinet 10, 3 is a game control circuit built into the cabinet 10, 4 is a simulated gun, 5 is a firing stand that houses a support device 6 for the simulated gun 4 and a vibration generator 7, 50 is a cabinet for this stand, and 8 is a signal transmission cable.

[0010] The program required for the game is loaded ahead of time into the game control circuit 3, and the developing situation of the game, including the image of the enemy that is the target in the gun battle, the background, obstacles, and so forth, is displayed on the video display device 2. The player uses the simulated gun 4 provided to the firing stand 5 to conduct a gun battle with the enemy appearing on the video display device.

[0011] Fig. 2 shows the details of the support device 6 and the vibration generator 7. 41 is the barrel[1] of the simulated gun 4, 42 is the trigger, and 43 is the grip. Inside the barrel 41 are housed a firing signal generator (not shown) and a firing sound and impact generator consisting of a solenoid 44, a compression spring 45, a weighted plunger 46, and a shock-absorbing rubber bushing 47.

[1] Translator's note: The Japanese word for barrel is used throughout the document, although from the drawings it does not appear to be a barrel per se, and might be more properly called the gun body.

[0012] When the trigger 42 is pulled, pulse current flows to the solenoid 44, while the firing signal generator sends out a pulse signal. When current flows to the solenoid 44, the weighted plunger 46 is pulled into the solenoid 44 against the elastic force of the compression spring 45, and then when the power is cut off, the weighted plunger 46 is repelled by the elastic force of the compression spring 45, and hits the shock-absorbing rubber bushing 47, which produces a firing sound and makes the barrel recoil. As the player continues to pull the trigger 42, the firing sounds and impacts are continuously generated.

[0013] The simulated gun support device 6 comprises a fixed support shaft 61 fixed to the bottom of the cabinet 50, a rotating support shaft 62, a fork 63 linked at its upper end to the grip 43, a pin 64 that bendably links the rotating support shaft 62 and the fork 63, a segment 65 that is attached to the rotating support shaft 62 and rotates together with the rotating support shaft 62, a potentiometer 66 that is controlled by the segment 65, a segment 67 that is attached to the fork 63 coaxially with the coupler pin 64 and that rotates together with the fork 63, a potentiometer 68 that is controlled by the segment 67, and a potentiometer supporting bracket 69 that is attached to the rotating support shaft 62.

[0014] The lower end of the rotating support shaft 62 is tubular in shape and rotatably fitted to the fixed support shaft 61, while the upper end is crimped flat. The forked portion at the lower end of the fork 63 flanks the flat part at the upper end of the rotating support shaft 62, and the two components are bendably coupled by the coupler pin 64. The potentiometer 66 comprises an input gear 661 and a converter 662, and is fixed to the cabinet 50 via a suitable bracket, and its input gear 661 meshes with the segment 65 that rotates together with the rotating support shaft 62.

[0015] The bracket 69 is welded to the rotating support shaft 62, and the potentiometer 68 is attached to this bracket 69. The potentiometer 68 comprises an input gear 681 and a converter 682, and is attached to the bracket 69, and its input gear 681 meshes with the segment 67 that rotates together with the fork 63.

[0016] Therefore, the orientation of the simulated gun 4 is controlled biaxially by the rotating support shaft 62 and the coupler pin 64, so the player can freely control the direction of the barrel 41 by turning the grip 43 to the right and left and pointing it up and down, allowing him to aim and fire at the image of the enemy appearing on the screen of the video display device 2. The azimuth and angle of elevation of the barrel 41 are converted into electrical signals by the potentiometer 66 and the potentiometer 68, respectively, and these signals are sent to the game control circuit 3.

[0017] As discussed above, when the player pulls the trigger 42, a fire signal is generated from the signal generator housed in the barrel 41, and this fire signal is also sent to the game control circuit 3. When a fire signal is generated, if the azimuth and elevation angle of the barrel 41 are within a predetermined range corresponding to the image of the enemy on the screen of the video display device 2, then the fired bullet is deemed to have hit the enemy, and the player earns points corresponding to the injury sustained by the enemy, but if the enemy accurately aims and fires at the player before the players knocks the enemy down, this is deemed a defeat of the player, and the player loses one friendly commando. The object of the game is to earn as many points as possible before all friendly commandos are wiped out.

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[0018] With a conventional video gun shooting game machine, an apparatus was provided for imparting some kind of shock or recoil to the barrel 41 when the player pulled the trigger, and this did give the player a sense of realism or simulation, but the only thing that happened when a friend was shot was that a crash image was displayed on the screen or a suitable simulated sound was generated, so the game was not interesting enough to keep a single player engrossed for a long period of time.

[0019] The structure of this game is illustrated by the flow chart in Fig. 3. First, the player inserts the required coin or the like to start the game. The enemy and the background and obstacles required for the game are displayed on the video screen, and the enemy attacks the player while hiding behind trees, houses, or other such obstacles. The player continues firing at the hiding enemy with the simulated gun as long as he is not hit by a bullet from the enemy. The enemy falls down, explodes, and disappears when struck by a bullet from the simulated gun, and the player earns points.

[0020] Meanwhile, if a bullet fire by the enemy hits the player, the player is injured, and life memory decreases. At the same time, an explosion pattern is displayed on the screen, and the life memory panel flashes. The game up to this point is the same as in the past.

[0021] With the video gun shooting game machine pertaining to the present invention, however, right after the above process, the vibration generator 7 is activated and the player's gun vibrates violently to the left and right. The vibration at this time makes it difficult for the player to aim, so he has to firmly hold on to the grip 43 and use all his strength to steady the simulated gun 4 and keep firing, which makes it seem like intense hand-to-hand combat. After a predetermined time corresponding to the injury sustained by the player has elapsed, the vibration generator 7 is switched off and the vibration of the simulated gun 4 stops.

[0022] As discussed above, and shown in Fig. 2, with the video gun shooting game machine pertaining to the present invention, the vibration generator 7 is provided to the simulated gun support device 6, and when the player is shot, this vibration generator imparts powerful vibration to the simulated gun 4, and this vibration is transmitted to the body of the player, making him feel as if he is really a part of the game. This vibration also hampers the player's ability to fire and makes it harder for him to play the game, so the player must hold on tightly to the grip and keep returning fire. This raises the player's excitement level and keeps him interested in the game.

[0023] In this example, the vibration generator 7 comprises a bracket 71 attached to the rotating support shaft 62, a motor 72, a reduction gear 73, and an eccentric weight 75 attached to the output shaft 74 of this reduction gear. If the game controller 3 recognizes an injury on the player side, the game controller 3 operates the motor 72 for a specific length of time at a predetermined speed according to the extent of the injury to the player.

[0024] The rotation of the motor 72 is transmitted by the output shaft 74 through the reduction gear 73, and the eccentric weight 75 is rotated at high speed, which generates a powerful vibration. Accordingly, the rotating support shaft 62 is subjected to powerful rotational vibration, and consequently the barrel 41 is also vibrated to the left and right. This allows the player to physically feel a hit, and furthermore this vibration makes it more difficult to aim and hampers the player's ability to fire, so the player has to hold on tightly to the grip while returning fire, which inexorably draws the player into the game

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and makes the battle experience even more realistic, so the interest in the game is even higher.

[0025] The constitution of the present invention is not limited to the example given above. For instance, the simulated gun can be a laser gun or one with a built-in CCD, and the gun need not be in the form of a rifle, and can instead be a bazooka, missile launcher, machine gun, pistol, or the like. Furthermore, the structure of the support device is not limited to the biaxial system described above, and depending on how a hit with the simulated gun is determined, a coil spring support system or a freely jointed system can be employed. It is also possible to do away with the support device and make the simulated gun completely hand-held. Also, the vibration generator need not be attached to the support device, its base, or the like, and can instead be attached directly to the simulated gun or can be built into the simulated gun. Furthermore, many different kinds of vibration generator can be used, such as a solenoid type, magnetic vibrator type, air motor type, spring type, or hammer concussion type, and the machine can also be designed so that the player can select or adjust the energy level of the vibration as desired. All of these variations are encompassed by the present invention.

[0026]

[Effect of the Invention]

The present invention has the constitution and operation described above, and therefore provides an extremely interesting video gun shooting game machine.

[Brief Description of the Drawings]

Fig. 1 is a diagram illustrating the overall structure of the video gun shooting game machine pertaining to the present invention.

Fig. 2 is a diagram illustrating an example of the structure of the simulated gun.

Fig. 3 is a flow chart of the game.

[Key]

1 overall game machine

2 video display device

3 game control circuit

4 simulated gun

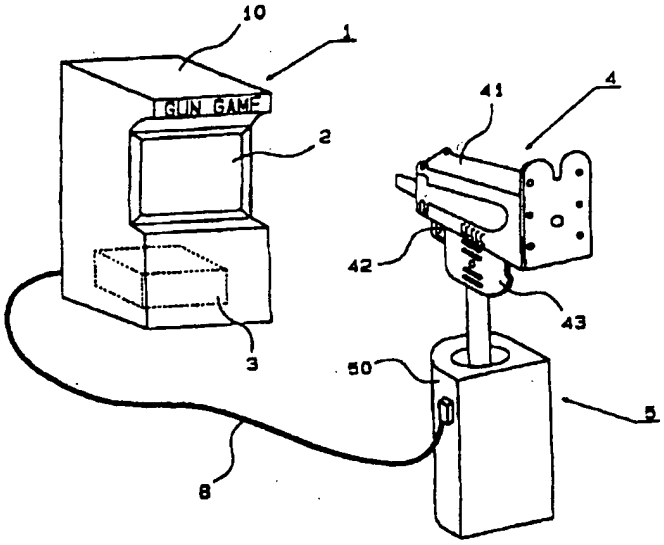
5 firing stand

6 simulated gun support device

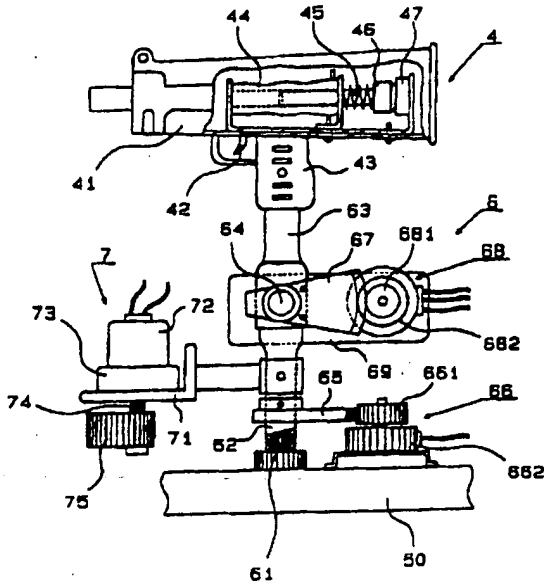
7 vibration generator

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[Figure 1]

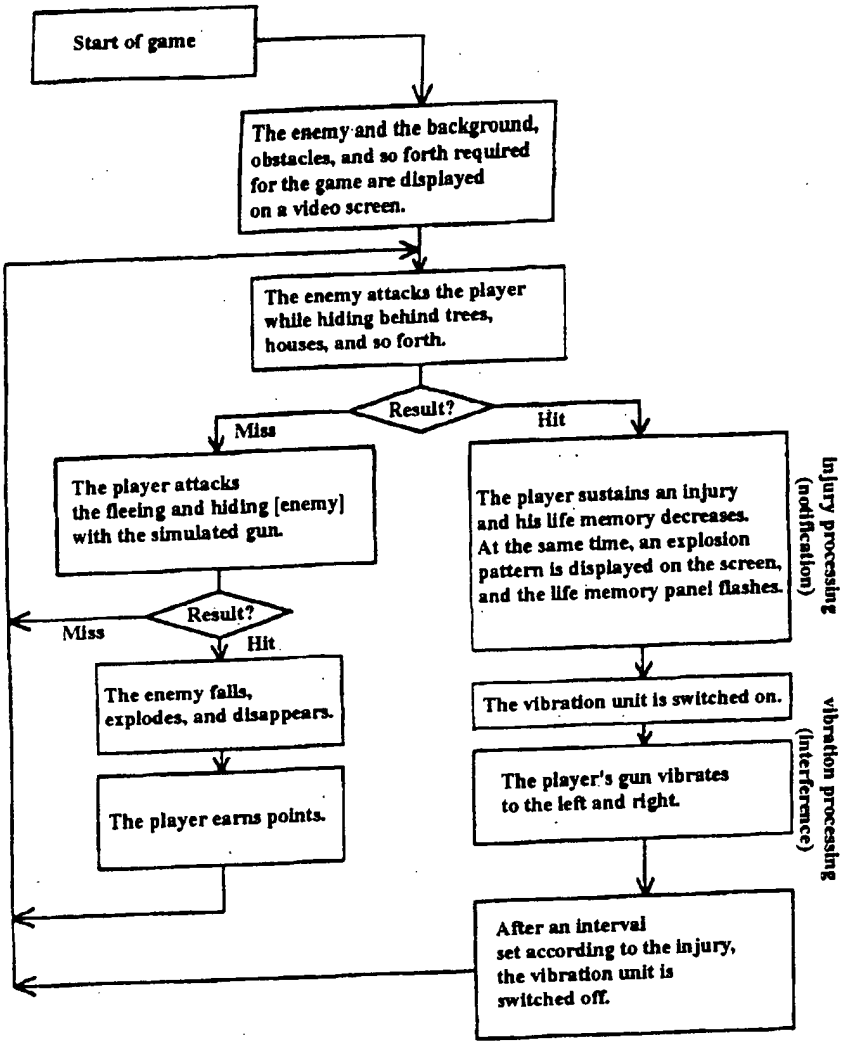


[Figure 2]



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[Figure 3]


Start of game
The enemy and the background, obstacles, and so forth required for the game are displayed on a video screen.
The enemy attacks the player while hiding behind trees, houses, and so forth.
Result?
Miss
Hit
The player attacks the fleeing and hiding [enemy] with the simulated gun.
Result?
Miss
Hit
The enemy falls, explodes, and disappears.
The player earns points.
The player sustains an injury and his life memory decreases. At the same time, an explosion pattern is displayed on the screen, and the life memory panel flashes.
Injury processing (notification)
The vibration unit is switched on.
The player's gun vibrates to the left and right.
vibration processing (interference)
After an interval set according to the injury, the vibration unit is switched off.

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